

We claim:

1. A process for preparing an amine by reacting a primary or secondary alcohol, aldehyde or ketone with hydrogen and a nitrogen compound selected from the group consisting of ammonia and primary and secondary amines in the presence of a catalyst whose preparation has involved precipitation of catalytically active components onto monoclinic, tetragonal or cubic zirconium dioxide.
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2. A process as claimed in the preceding claims, wherein the catalytically active components precipitated are salts of a metal selected from transition groups VIII and IB of the Periodic Table.
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3. A process as claimed in the preceding claim, wherein the metal salts are basic salts which are sparingly soluble or insoluble in water.
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4. A process as claimed in either of the two preceding claims, wherein the salts are oxides, hydrated oxides, hydroxides, carbonates and/or hydrogencarbonates.
5. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Pt and Cu.
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6. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Cu, Ni and Co.
7. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 85% by weight of oxygen-containing compounds of zirconium, calculated as ZrO_2 , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO , and from 14 to 70% by weight of oxygen-containing compounds of nickel, calculated as NiO .
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8. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 65% by weight of oxygen-containing compounds of zirconium, calculated as ZrO_2 , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO , from 15 to 50% by weight of oxygen-containing compounds of nickel, calculated as NiO , and from 15 to 50% by weight of oxygen-containing compounds of cobalt, calculated as CoO .
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9. A process as claimed in any of claims 5 to 8, wherein the molar ratio of nickel to copper is greater than 1.

10. A process as claimed in any of the preceding claims, wherein the monoclinic, tetragonal or cubic zirconium dioxide contains one or more oxides of metals of transition groups IIIB or main group IIA of the Periodic Table.

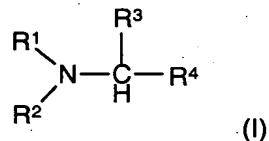
5 11. A process as claimed in any of the preceding claims, wherein the reaction is carried out at from 80 to 300°C.

12. A process as claimed in any of the preceding claims, wherein the reaction is carried out in the liquid phase at pressures of from 5 to 30 MPa or in the gas phase at pressures of

10 from 0.1 to 40 MPa.

13. A process as claimed in any of the preceding claims for preparing an amine of the formula

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where

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 R^1, R^2

are each hydrogen (H), alkyl such as C_{1-20} -alkyl, cycloalkyl such as C_{3-12} -cycloalkyl, alkoxyalkyl such as C_{2-30} -alkoxyalkyl, dialkylaminoalkyl such as C_{3-30} -dialkylaminoalkyl, aryl, aralkyl such as C_{7-20} -aralkyl or alkylaryl such as C_{7-20} -alkylaryl, or together form $-(\text{CH}_2)_j\text{X}-(\text{CH}_2)_k-$,

 R^3, R^4

are each hydrogen (H), alkyl such as C_{1-200} -alkyl, cycloalkyl such as C_{3-12} -cycloalkyl, hydroxyalkyl such as C_{1-20} -hydroxyalkyl, aminoalkyl such as C_{1-20} -aminoalkyl, hydroxyalkylaminoalkyl such as C_{2-20} -hydroxyalkylaminoalkyl, alkoxyalkyl such as C_{2-30} -alkoxyalkyl, dialkylaminoalkyl such as C_{3-30} -dialkylaminoalkyl, alkylaminoalkyl such as C_{2-30} -alkylaminoalkyl, $\text{R}^5-(\text{OCR}^6\text{R}^7\text{CR}^8\text{R}^9)_n-(\text{OCR}^6\text{R}^7)$, aryl, heteroaryl, aralkyl such as C_{7-20} -aralkyl, heteroarylalkyl such as C_{4-20} -heteroarylalkyl, alkylaryl such as C_{7-20} -alkylaryl, alkylheteroaryl such as C_{4-20} -alkylheteroaryl or $\text{Y}-(\text{CH}_2)_m\text{NR}^5-(\text{CH}_2)_n$, or together form $-(\text{CH}_2)_l\text{X}-(\text{CH}_2)_m-$, or

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R² and R⁴together form -(CH₂)₁-X-(CH₂)_m-,R⁵, R¹⁰are each hydrogen (H), alkyl such as C₁₋₄-alkyl or alkylphenyl such as C₇₋₄₀-alkylphenyl,

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R⁶, R⁷, R⁸, R⁹

are each hydrogen (H), methyl or ethyl,

X

is CH₂, CHR⁵, oxygen (O), sulfur (S) or NR⁵,

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Y

is N(R¹⁰)₂, hydroxy, C₂₋₂₀-alkylaminoalkyl or C₃₋₂₀-dialkylaminoalkyl,

n

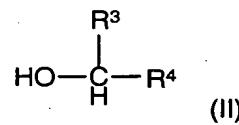
is an integer from 1 to 30 and

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j, k, l, m, q

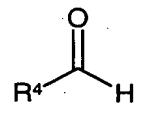
are each an integer from 1 to 4,

by reacting a primary or secondary alcohol of the formula II

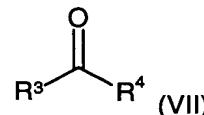


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or aldehyde or ketone of the formula VI or VII

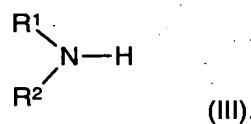


(VI)



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with a nitrogen compound of the formula III



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14. The use of a catalyst as claimed in any of claims 1 to 10 for preparing an amine by reacting a primary or secondary alcohol, aldehyde or ketone with hydrogen and a nitrogen compound selected from the group consisting of ammonia and primary and secondary amines.